sity (photopathic reaction), and is not, as far as is known, a color response (chromopathy). G. H. P.

Embryology of the Cladoceran Penilia. — The development of Penilia has been studied by M. T. Sudler.[1] The four to six oval eggs of a single laying are usually so placed in the brood sac of the female that their long axes are very nearly parallel to that of the female. The long axis of the egg corresponds to that of the future embryo, and the end of the embryo pointed forward in the brood sac becomes the head. The segmentation of Penilia is total and remains so throughout in strong contrast to that in most other Crustacea. As in Nereis, the first cleavage plane is transverse to the chief axis of the future embryo; the second is in the sagittal plane; and the third is at right angles to both previous planes; the fourth is parallel to the first; and from the fifth on, no clear characterization can be made. Gastrulation takes place in definite relation to the maternal body, *i.e.*, at what may be described as the outer posterior corner of the embryo. The mesoderm originates from either side of the mid-ventral line, and in a way that prevents it from being clearly distinguished from the entoderm for some time. The gastrula mouth closes in the region afterwards occupied by the anus. The order of appearance of the appendages is open to some variation, but is usually as follows: second antenna, first antenna, mandible, first maxilla, second maxilla, thoracic appendages in sequence from the anterior end. Organogeny is briefly dealt with. The reproductive organs cannot be traced to a single cell, as in Moina according to Grobben. On the whole, Penilia gives evidence of being a highly specialized rather than a primitive cladoceran. G. H. P.

Artificial Parthenogenesis in the Sea Urchin. — Observations on the influence that various dissolved substances have on living muscle and on the fertilized and unfertilized eggs of marine animals have led Loeb[2] to suspect that the reason unfertilized eggs do not develop is not only because of lack of the spermatozoan, but also because of the constitution of the sea water. The addition of magnesium chloride to sea water (5000 $\frac{1}{8}$ n $MgCl_2$ in 5000 cc. of sea

[1] Sudler, M. T. The Development of Penilia schmackeri Richard, *Proc. Boston Soc. Nat. Hist.*, vol. 29, pp. 109–131, 3 plates. October, 1899.

[2] Loeb, J. On the Nature of the Process of Fertilization and the Artificial Production of Normal Larvæ (Plutei) from Unfertilized Eggs of the Sea Urchin, *Amer. Journ. Physiol.*, vol. iii, pp. 135–138. October, 1899.

water) produces a solution which affects unfertilized eggs in the same way as the entrance of a spermatozoan does. Eggs of the sea urchin, when left in this solution for about two hours and then transferred to normal sea water, formed gastrulæ and plutei normal in every respect. In the experiment fewer eggs developed, and their development was slower than under normal conditions. This experiment shows that the unfertilized egg of the sea urchin contains all the essential elements for the production of a perfect pluteus. The reason that sea urchin eggs do not develop parthenogenetically under normal conditions is the constitution of the sea water; this either lacks the presence of a sufficient number of ions necessary for cell division (magnesium, potassium, hydroxyl, or others) or it contains too many unfavorable ions (calcium, sodium, or others). All the spermatozoan needs to carry into the egg for fertilization are ions to supplement one class of substances or counteract the other or both. The spermatozoan may of course also carry in other materials, enzymes, etc. The author concludes this interesting paper with the suggestion that possibly parthenogenesis in mammals is prevented by the ions of the mammalian blood. G. H. P.

Notes. — The concluding number of the *Zoölogical Bulletin* contains the following articles: "The Mesenterial Filaments in Zoanthus sociatus," by J. P. McMurrich; "The Unpaired Ectodermal Structures of the Antennata," by M. M. Enteman; "Synopsis of the Calliphorinæ of the United States," by G. de N. Hough; and "The Accessory Bladders of the Testudinata," by F. W. Pickel. It has been announced that the *Bulletin* will be continued under the name of the *Biological Bulletin*.

A Biological Survey of Mount Shasta, California, has been undertaken by the United States Department of Agriculture, and has been reported upon in *North American Fauna*, No. 16. The general features of the mountain, the forests and forest fires, the life zones, the mammals, birds, and plants of the region are described and the factors influencing distribution are discussed.

BOTANY.

Botanical Papers at the British Association. — Some of the papers presented before the botanical section of the British Association were of unusual importance, and the average merit of the